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SILVICAL LEAFLET 53.

RED ALDER.

Alnus oregona Nutt.

Of the 15 species of alder (*Alnus*) distinguished by botanists, most are shrubs which usually grow as a fringe along creeks and meadows. Six species of alder, however, grow to tree size in the United States. The most important of these is red alder, a medium-sized tree of the Pacific coast region. Although it has no particularly excellent qualities, and is not abundant enough to be very important commercially, it is one of the conspicuous broadleaf trees of its range, where there are but few broadleaves of any species.

RANGE AND OCCURRENCE.

Red alder grows naturally from Yakutat Bay, near Sitka, in southeastern Alaska, southward through the islands and coast ranges of British Columbia and along the coast ranges of Washington, Oregon, and California as far south as Los Angeles County, and also along the western slopes of the Cascade Mountains of Washington and Oregon to the Siskiyou Mountains.

It is distinctly a tree of moist situations and grows, therefore, chiefly along streams, near springs, in river bottoms, and on particularly well-watered slopes. In Washington and Oregon, the region of its best development, it rarely grows at an altitude higher than 2,000 feet. In northern California, however, it apparently does best at an altitude of about 3,000 feet; at higher elevations it grows only to sapling size, usually in dense thickets. In the southern part of its range in California it is confined to canyons.

CLIMATE.

The climate within the greater part of the range of this tree is temperate and humid. The annual precipitation is more than 40 inches, and sometimes even as much as 100 inches; the growing season is long, and is free from frosts for from four to five months. In the southern part of its range in California it grows where the pre-

cipitation is much lighter, but only in moist sites. The fact that it is confined to low elevations indicates that it will not endure severe cold and requires mild temperatures. A considerable degree of atmospheric humidity also seems requisite for its best development, though in this regard it is not so fastidious as some of its associates.

ASSOCIATED SPECIES.

Red alder normally occurs in the forest as an incidental species in mixture with a variety of other moisture-loving trees, such as western red cedar, lowland fir, Sitka spruce, western hemlock, Douglas fir, Oregon ash, California laurel, various species of oak, broadleaf maple, black cottonwood, cascara, and western dogwood. In some places several of these species are in the mixture, elsewhere but one or two of them occur. Less commonly red alder forms a pure stand in bottom lands or along watercourses.

On the lower slopes of the coast mountains of Washington and Oregon red alder sometimes grows in pure stands over large areas, and takes possession of burned-over lands which have been slow to reforest with conifers. In such situations it is usually but a temporary type, which gives way after the maturity of the alder to the conifers—Douglas fir, western hemlock, western red cedar, or Lawson cypress—which come up beneath its cover.

HABITS.

Red alder attains a maximum size of 100 feet in height and $3\frac{1}{2}$ feet in diameter. Its usual size in the region of its best development is from 50 to 75 feet high, and from 12 to 18 inches in diameter. In form it is usually straight, fairly cylindrical, and free of branches for at least 25 or 30 feet. In the open, or in situations which are unfavorable, the tree is apt to fork and to have a short, clear bole.

The root system, as would be expected from its preference for moist soils, is shallow; this results in frequent windfalls where the tree is exposed to high winds.

SOIL AND MOISTURE.

Abundant soil moisture, as on well-watered hillsides or on bottoms, is a prime requirement of this species. While it will grow in very wet, almost swampy, ground, it does not grow in bottoms subject to overflow. It also prefers a deep, fertile, loamy soil, but will grow in either gravels, sands, or clays.

TOLERANCE.

Red alder compared with its associated broadleaf trees is below the average in its ability to endure shade, although it is the most

tolerant of the tree alders. It never grows in deep shade, nor does it cast an extremely dense shadow; it usually secures some side light as well as light from above. In mixture with other species it must occupy a dominant or codominant position in the crown canopy; in pure stands its density is less than 0.75, so that coniferous seedlings can start beneath its shade.

GROWTH AND LONGEVITY.

Seventy-five years is probably an old age for this tree, and it may be said to be mature at about 50 years. In early life it grows very rapidly, more rapidly even than Douglas fir and the associated broadleaf species, and a tree as young as 35 years may be 19 inches in diameter. Owing to its early maturity, however, the species which are first surpassed by red alder later outstrip it.

SUSCEPTIBILITY TO INJURY.

Red alder is a fairly hardy species, and the greatest damage to it is due to windfall. While its thin bark allows it to be easily killed by forest fires, it grows in situations where fires are infrequent. After maturity it is likely to be affected with decay.

REPRODUCTION.

Seed production is only moderately abundant, and judging by the way in which burns become restocked with alder, the seed must scatter widely and germinate freely. The seedlings are able to start either on litter or on mineral soil, in partial shade or in the open. In Washington and Oregon it sprouts vigorously from the stump after cutting; in California sprouts are less common and are usually from the root of the parent tree.

UTILIZATION.

The wood of red alder is pale reddish-brown, rather fine, even-grained, compact, light, but only moderately strong. It takes an excellent polish, turns and glues well, works easily, does not shrink or check, and when finished resembles cherry. These qualities make it a suitable wood for furniture and cabinet making. It is also used for broom handles, saddles, and interior finish. Its use at present, however (less than 400,000 board feet annually in the wood-using industries of Oregon), is much less than the good qualities of the wood and the abundance of the supply warrant.

Red alder has been used for some years in a small way on the Oregon coast for piling, for which it has proved most satisfactory. It lasts well under water, drives easily, and is said to resist the

teredo. It is also cut for cordwood to a small extent. Experiments indicate that its wood is suitable for the manufacture of book and magazine paper, although its preparation for pulp is more difficult than that of the aspens, which are so largely used for this purpose.

MANAGEMENT.

Red alder is not a tree which merits the forester's especial care, although it is one of the most abundant broadleaf trees of western Washington and Oregon. It is usually an incidental tree on soils which are either well adapted to better forest trees or which are suitable for agriculture. Where it occurs in pure stands, as on the coast mountains of Oregon and Washington, it is a temporary type which will give place to the coniferous species, chiefly Douglas fir, which are better suited to these hillsides and are far preferable.

The forester's chief aim should not be to encourage this species, but to find a means of profitably disposing of what already exists. Stands of alder, wherever practicable, should be utilized before decadence sets in, and in cutting them an effort should be made to convert the forest of alder into a forest of more desirable species.